TABLE XVII

CATHODE: $ZnFe_2O_4/Pt$

ANODE: Pt

Per Example C-9

| Ex. | Temp.C | I.mA | App.,V | Feed | ppm$SO_2$ Effluent | % $SO_2$ Reduced |
|---|---|---|---|---|---|---|
| E-10: | | | | | | |
| 10-1 | 700 | 40 | 0 | A | 7650 | 17.7 |
| 10-2 | 700 | 50 | 0.1 | A | 6350 | 31.7 |
| 10-3 | 700 | 65 | 0.2 | A | 5147 | 44.7 |
| 10-4 | 700 | 80 | 0.3 | A | 3497 | 62.4 |
| 10-5 | 700 | 100 | 0.3 | B | 229 | 97.5 |
| C/7 | 700 | OPEN | OPEN | B | 12,587 | * |
| 10-6 | 700 | 100 | 0.3 | B | 366 | 96.0 |
| 10-7 | 700 | 160 | 0.3 | C | 201 | 97.6 |
| C/8 | 700 | OPEN | OPEN | C | 19,256 | * |
| C/9 | 700 | OPEN | OPEN | C | 7273 | 12.4 |
| 10-8 | 700 | 250 | 0.3 | C | 548 | 93.4 |
| 10/9 | 700 | 200 | 0.2 | C | 418 | 95.0 |
| 10-10 | 700 | 180 | 0.032 | C | 582 | 93.0 |

* = $SO_2$ concentration of effluent exceeds that of feed indicating adsorbed $SO_2$ is desorbing from the catalyst during the experiment

A = 9300 ppm $SO_2$ in He
B = 9200 ppm $SO_2$, 2700 ppm $O_2$ in $N_2$
C = 8300 ppm $SO_2$, 21,000 ppm $O_2$ in $N_2$

Experiments 10-1 through 10-4 show that zinc ferrite is an effective electrocatalyst for the reduction of $SO_2$, and that increasing driving force (applied potential) increases the removal rate. Experiment 10-1 also shows that no potential is needed to reduce $SO_2$.

Experiments 10-5 and 10-6 and Comparative Experiment C/7 show that in the presence of oxygen zinc ferrite is still an effective $SO_2$ reduction electrocatalyst and that under the open circuit conditions of Comparative Experiment C/7, where no oxygen transport occurs, $SO_2$ is not removed. In fact, previously adsorbed $SO_2$ begins to desorb.

Experiment 10-7 shows that higher concentrations of oxygen do not adversely affect the $SO_2$ reduction process, and Comparative Experiment C/8 shows that when the circuit is opened to stop oxygen transport, the $SO_2$ reduction ceases and $SO_2$ desorption begins. Comparative Experiment C/9 is conducted about 24 hours after Comparative Experiment C/8